



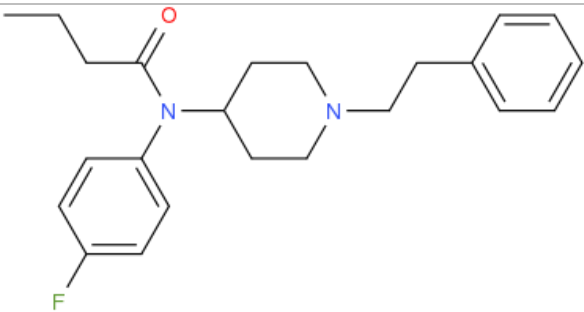
ANALYTICAL REPORT¹

4F-BF (C₂₃H₂₉FN₂O)

1-((4-fluorophenyl)(1-phenethylpiperidin-4-yl)amino)butan-1-one

Remark – other NPS detected: **none**

Sample ID:	1259-15
Sample description:	powder - white-yellowish
Sample type:	test purchase /RESPONSE -purchasing
Date of sample receipt (M/D/Y):	9/2/2015
Date of entry (M/D/Y) into NFL database:	9/2/2015
Report updates (if any) will be published here:	http://www.policija.si/apps/nfl_response_web/seznam.php

Substance identified - structure ² (base form)	
Systematic name	1-((4-fluorophenyl)(1-phenethylpiperidin-4-yl)amino)butan-1-one
Other names	4F-BF/4-fluoro-butyrfentanyl
Formula (per base form)	C ₂₃ H ₂₉ FN ₂ O
M _w (g/mol)	368.49
Salt form	HCl
StdInChIKey	QZFMICYUBPSLOBP-UHFFFAOYSA-N
Compound Class	Opioids
Other NPS detected	none
Add.info (purity..)	

¹ This report has been produced with the financial support of the Prevention of and fight against crime Programme of the European Union (grant agreement number JUST/2013/ISEC/DRUGS/AG/6413). The contents of this report are the sole responsibility of the National Forensic Laboratory and can in no way be taken to reflect the views of the European Commission.

² Created by OPSIN free tool: <http://opsin.ch.cam.ac.uk/> DOI: 10.1021/ci100384d

Report updates

date	comments (explanation)

Instrumental methods (if applied) in NFL

1. GC-MS (Agilent): GC-method is RT locked to tetracosane (RT=9.53 min). Injection volume 1 ml and split mode (1:50) . Injector temperature: 280 °C. Chromatographic separation: on column HP1-MS (100% dimethylpolysiloxane), length 30 m, internal diameter 0.25 mm, film thickness 0.25 mm. Carrier gas He: flow-rate 1.2 ml/min. GC oven program: 170 °C for 1 min, followed by heating up to 293 °C at a rate of 18 °C/min, hold for 6.1 min, then heating at 50 °C/min up to 325 °C and finally 2.8 min isothermal. MSD source EI = 70 eV. GC-MS transfer line T= 235°C, source and quadropole temperatures 280°C and 180°C, respectively. Scan range m/z scan range: from 50 (40) to 550 amu.

2. HPLC-TOF (Agilent): 6230B TOF with Agilent 1260 Infinity HPLC with binary pump, column: Zorbax Eclipse XDB-C18, 50 x 4.6 mm, 1.8 micron. Mobile phases (A) 0.1% formic acid and 1mM ammonium formate in water; (B) 0.1% formic acid in methanol (B). Gradient: starting at 5% B, changing to 40% B over 4 min, then to 70% over 2 min and in 5 min to 100%, hold 1 min and back to 5%, equilibration for 1.7 min. The flow rate: 1.0 ml/min; Injection volume 1 µl. MS parameters: 2GHz, Extended Dynamic range mode to a maximum of 1700 amu, acquisition rate 1.30 spectra/sec. Sample ionisation: by Agilent Jet Stream technology (Dual AJS ESI). Ion source: positive ion scan mode with mass scanning from 82 to 1000 amu. Other TOF parameters: drying gas (N₂) and sheath temperature 325 °C; drying gas flow rate 6 l/min; sheath gas flow rate 8 l/min; nebulizer 25 psig; Vcap. 4000 V; nozzle 2000 V; skimmer 65 V; fragmentor 175 V and Octopole RF 750 V.

3. FTIR-ATR (Perkin Elmer): scan range 4000-400 cm⁻¹; resolution 4cm⁻¹

4. GC- (MS)-IR condensed phase (GC-MS (Agilent) & IR (Spectra analyses-Danny)
GC-method: Injection volume 1 ml and split mode (1:5). Injector temperature 280 °C. Chromatographic separation as above (**1**). Split MS : IR = 1:9.
MSD source EI = 70 eV. GC-MS transfer line T= 235°C, source and quadropole temperatures 280°C and 180°C, respectively. Scan range m/z scan range: from 50 (40) to 550 amu.
IR (condensed phase): IR scan range 4000 to 650, resolution 4 cm⁻¹.

5. IC (anions) (Thermo Scientific, Dionex ICS 2100), Column: IonPac AS19, 2 x 250mm; Eluent: 10mM from 0 to 10 min, 10-58 mM from 10 to 40min; Flow rate: 0.25 ml/min; Temperature: 30°C; Suppressor: AERS 500 2mm, suppressor current 13mA; Inj. Volume: 25 µl

Supporting information

Solubility in	result/remark
CH ₂ Cl ₂	soluble
MeOH	soluble
H ₂ O	soluble

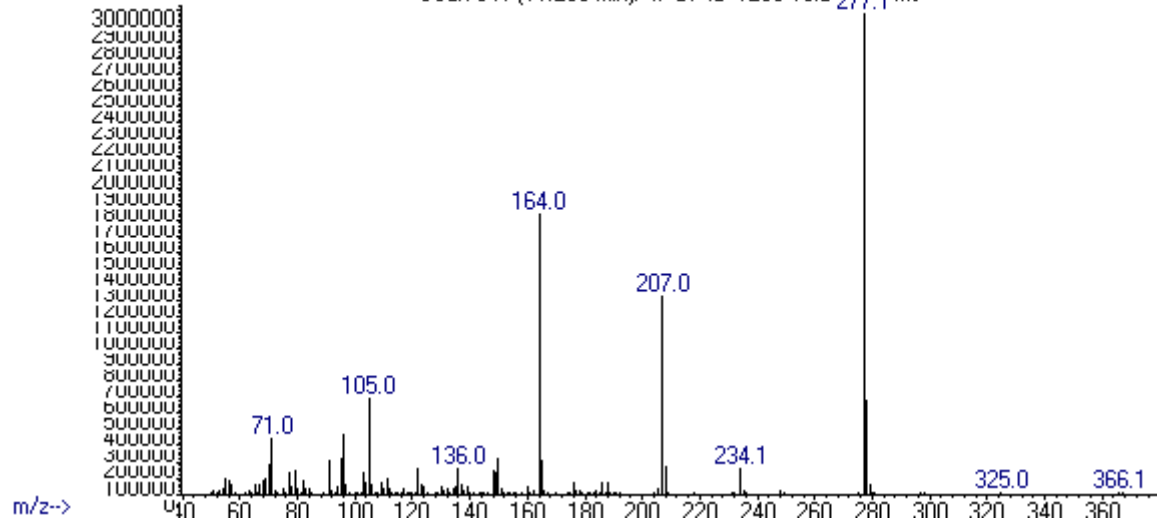
Analytical technique:	applied	remarks
GC-MS (EI ionization)	+	NFL GC-RT (min): 11.29 BP(1): 277; BP(2): 164, BP(3) :207,
HPLC-TOF	+	Exact mass (theoretical): 368.2264; measured value Δppm:-0.91; formula:C ₂₃ H ₂₉ FN ₂ O
FTIR-ATR	+	direct measurement (sample as received)
FTIR (condensed phase) always as base form	+	
IC (anions)	+	
NMR (in FKKT)	+	
validation		
other		

ANALYTICAL RESULTS

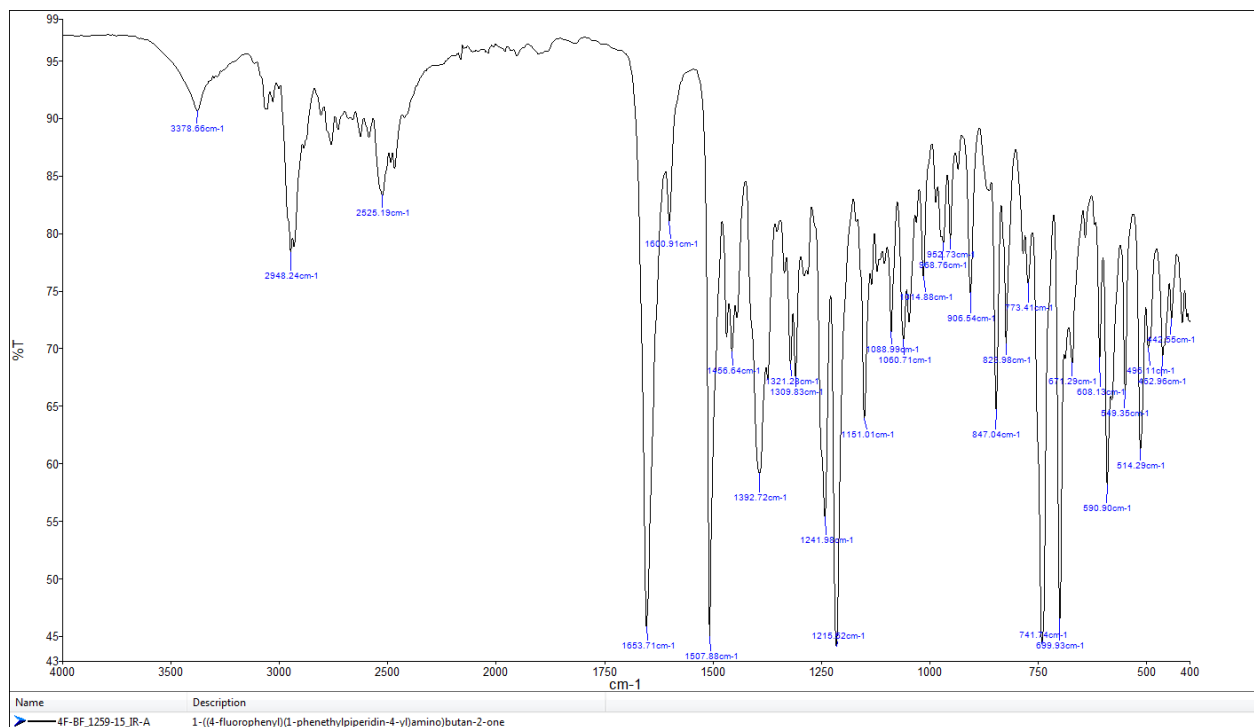
MS (EI)

Abundance

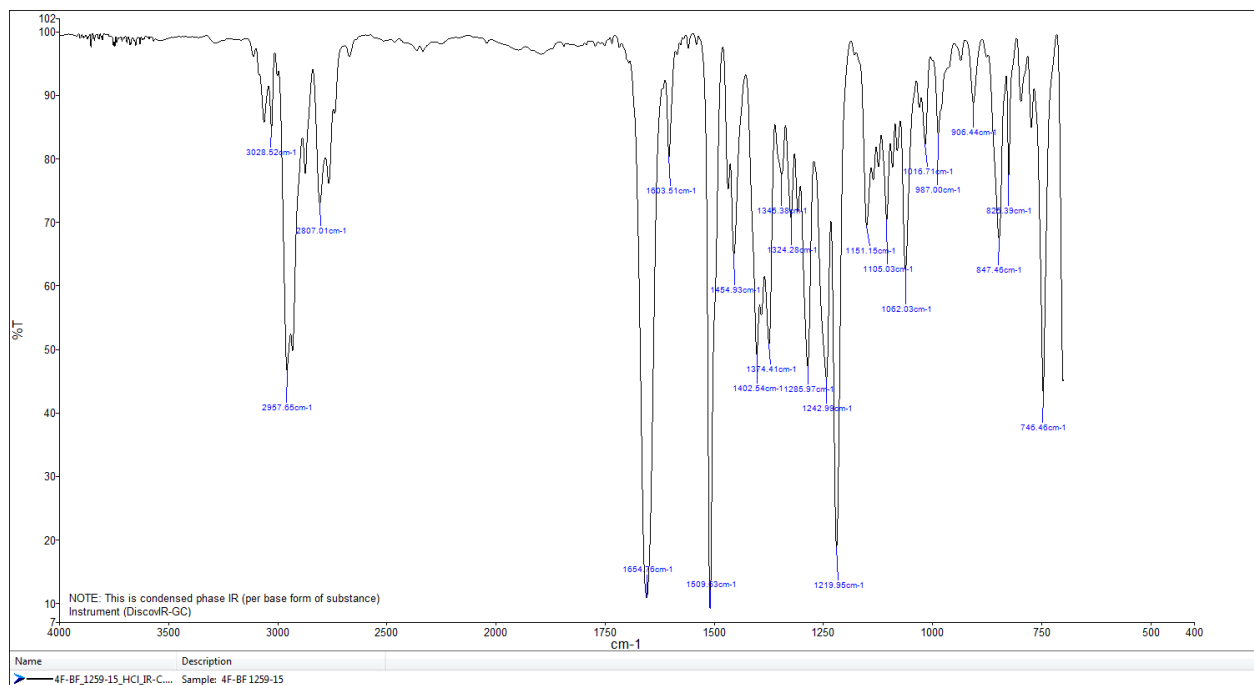
Scan 841 (11.290 min): 4F-BF-ID-1259-15.D 277.1 ms



FTIR-ATR - direct measurement (sample as received)



IR (condensed phase – after chromatographic separation)



Target Compound Screening Report

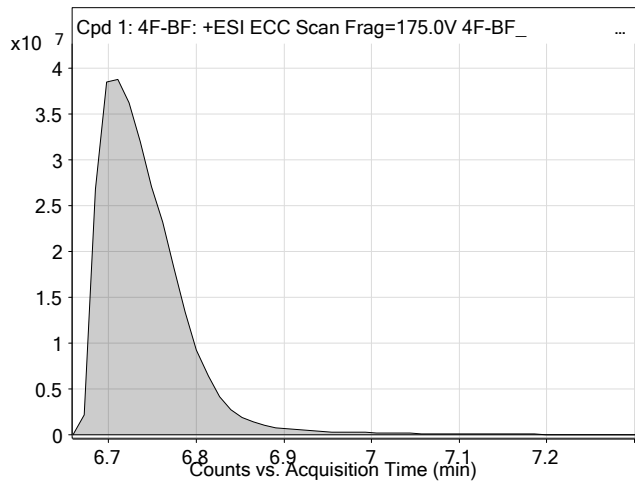
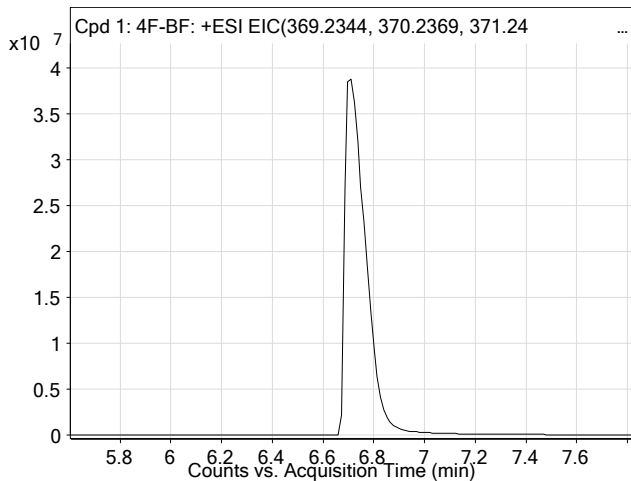
Data File	4F-BF_1259-15_TOF.d	Sample Name	1259-15
Sample Type	Sample	Position	P1-B1
Instrument Name	6230B TOF LC-MS	User Name	TG
Acq Method	droge general-13-5-2015-XDB-C18-ESI-poz.m	Acquired Time	9/2/2015 12:43:27 PM
IRM Calibration Status	Success	DA Method	Droge_Default.m
Comment	extract in MeOH		

Compound Table

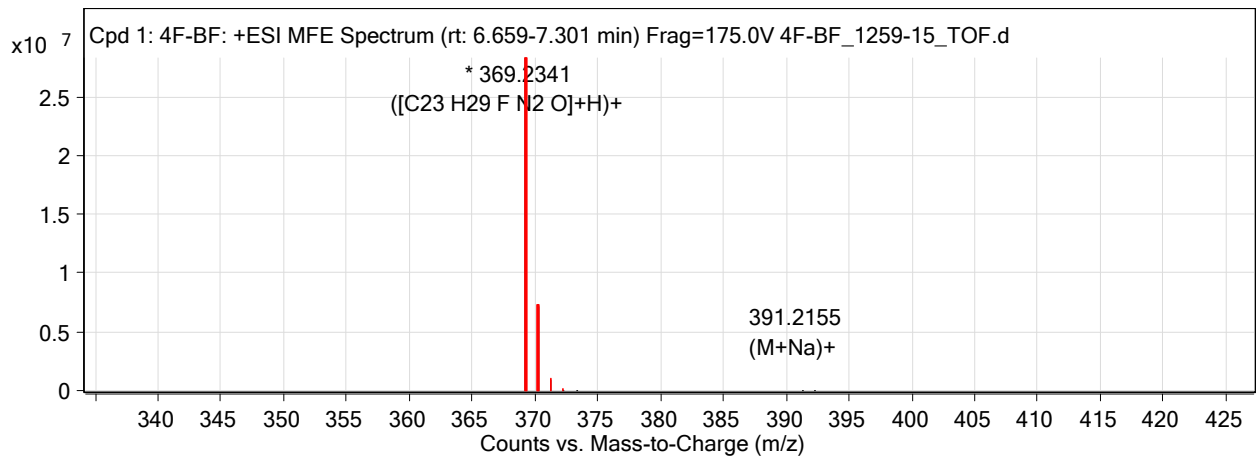
Label	Tgt Name	Obs. RT	Obs. Mass
Cpd 1: 4F-BF	4F-BF	6.719	368.2267

Name	Obs. m/z	Obs. RT	Obs. Mass	DB Formula	DB Mass	DB Mass Error (ppm)	Find Cmps Algorithm
4F-BF	369.2341	6.719	368.2267	C23 H29 F N2 O	368.2264	-0.91	Find by Molecular Feature

Compound Chromatograms



MFE MS Zoomed Spectrum

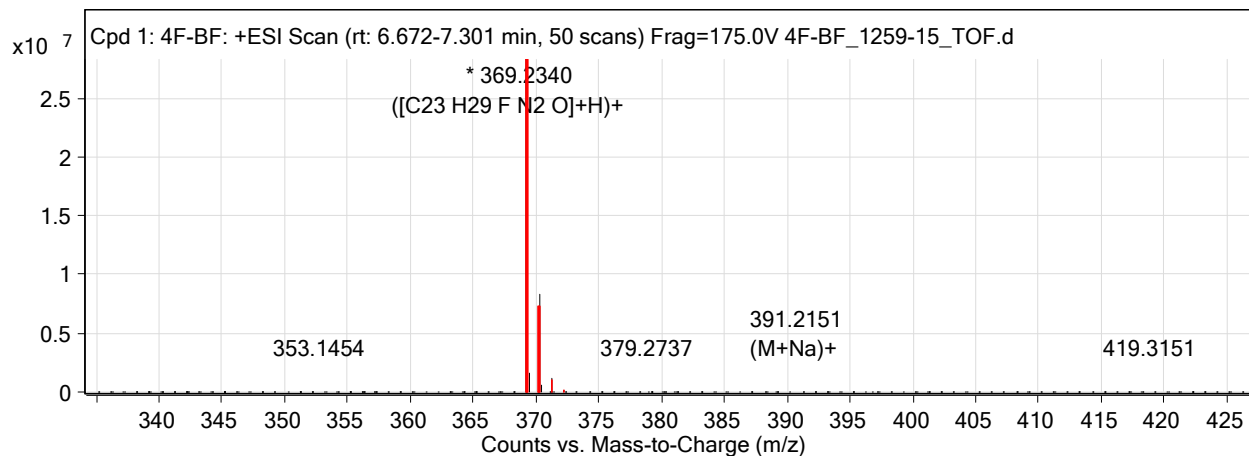


MS Spectrum Peak List

Obs. m/z	Charge	Abund	Formula	Ion/Isotope
369.2341	1	28282504	C23 H29 F N2 O	(M+H)+
370.2369	1	7101225.96	C23 H29 F N2 O	(M+H)+
371.2403	1	855682.44	C23 H29 F N2 O	(M+H)+
372.2433	1	70195.86	C23 H29 F N2 O	(M+H)+
373.245	1	3476.55	C23 H29 F N2 O	(M+H)+
391.2155	1	56487.14		(M+Na)+
392.2188	1	14430.31		(M+Na)+

Target Compound Screening Report

MS Zoomed Spectrum

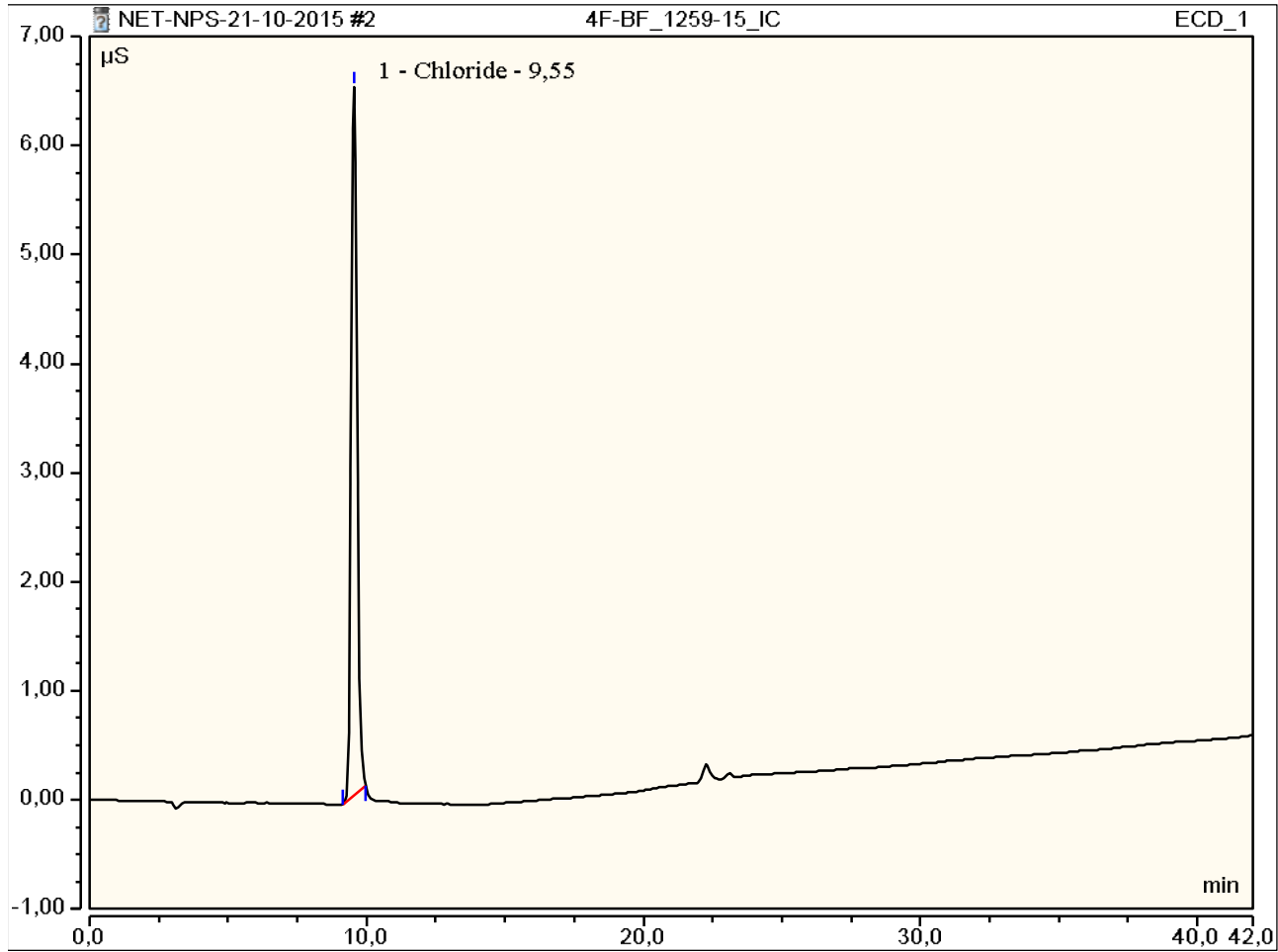


--- End Of Report ---

Peak Integration Report

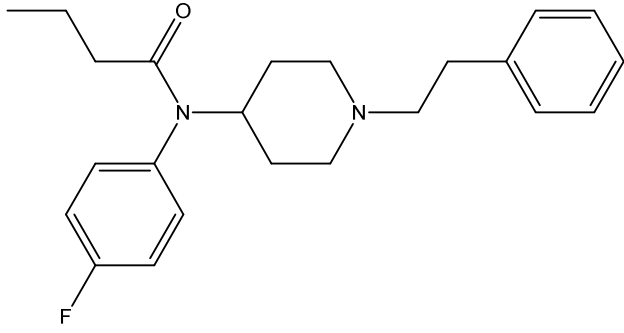
Sample Name:	4F-BF_1259-15_IC	Inj. Vol.:	25,00
Injection Type:	Unknown	Dilution Factor:	1,0000
Program:	ANIONI	Operator:	kemija
Inj. Date / Time:	21-okt-2015 / 14:59	Run Time:	42,00

No.	Time min	Peak Name	Peak Type	Area $\mu\text{S} \cdot \text{min}$	Height μS	Amount mg/L
1,00	9,55	Chloride	BMB	1,58	6,49	n.a.
TOTAL:				1,58	6,49	0,00





REPORT

Sample ID:	1259-15
Our notebook code:	P-1259-15
NMR sample preparation:	15 mg dissolved in 0.7 mL DMSO- d_6
NMR experiments:	^1H , ^{13}C , ^1H - ^1H <i>gs</i> -COSY, ^1H - ^{13}C <i>gs</i> -HSQC.
Proposed structure:	
Chemical name:	N-(4-fluorophenyl)-N-(1-phenethylpiperidin-4-yl)butyramide
Comments:	- Structure elucidation based on 1D and 2D NMR spectra - Compound is not pure by NMR, it contains an appreciable amount of organic impurities (most evident in ^1H NMR, signals between 7.5 and 10.0 ppm).
Supporting information:	Copies of ^1H and ^{13}C NMR spectra
Author:	Prof. Dr. Janez Košmrlj, Doc. Dr. Krištof Kranjc
Date of report:	December 2, 2015

P-1259-15

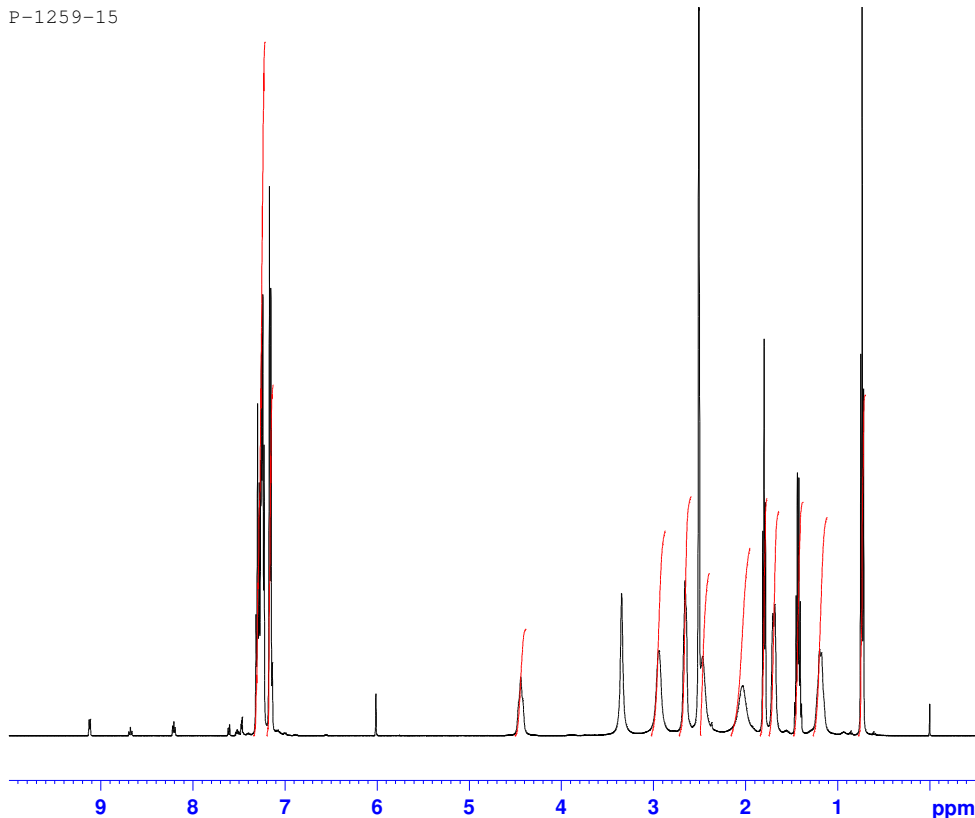


Current Data Parameters
 NAME P-1259-15
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20151101
 Time 3.26
 INSTRUM spect
 PROBHD 5 mm PABBO BB-
 PULPROG zg30
 TD 65536
 SOLVENT DMSO
 NS 16
 DS 2
 SWH 10330.578 Hz
 FIDRES 0.157632 Hz
 AQ 3.1719923 sec
 RG 71.8
 DW 48.400 usec
 DE 6.50 usec
 TE 296.0 K
 D1 1.00000000 sec

===== CHANNEL f1 =====
 NUC1 1H
 P1 8.90 usec
 PLW1 26.00000000 W
 SFO1 500.1330885 MHz

F2 - Processing parameters
 SI 65536
 SF 500.1300026 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



P-1259-15



Current Data Parameters
 NAME P-1259-15
 EXPNO 4
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20151101
 Time 6.16
 INSTRUM spect
 PROBHD 5 mm PABBO BB-
 PULPROG zgpg30
 TD 65536
 SOLVENT DMSO
 NS 4096
 DS 4
 SWH 29761.904 Hz
 FIDRES 0.454131 Hz
 AQ 1.1010548 sec
 RG 2050
 DW 16.800 usec
 DE 6.50 usec
 TE 296.0 K
 D1 1.00000000 sec
 D11 0.03000000 sec

===== CHANNEL f1 =====
 NUC1 13C
 P1 9.00 usec
 PLW1 122.00000000 W
 SFO1 125.7703637 MHz

===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PLW2 26.00000000 W
 PLW12 0.32179001 W
 PLW13 0.20595001 W
 SFO2 500.1320005 MHz

F2 - Processing parameters
 SI 32768
 SF 125.7577890 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

